Joint Polar Satellite System

NOAA Satellite Conference

GLOBAL **DATA.**
LOCAL **WEATHER.**

Program
DESCRIPTION

Program of Record: SNPP, JPSS-1, JPSS-2 and Ground System Development and Maintenance
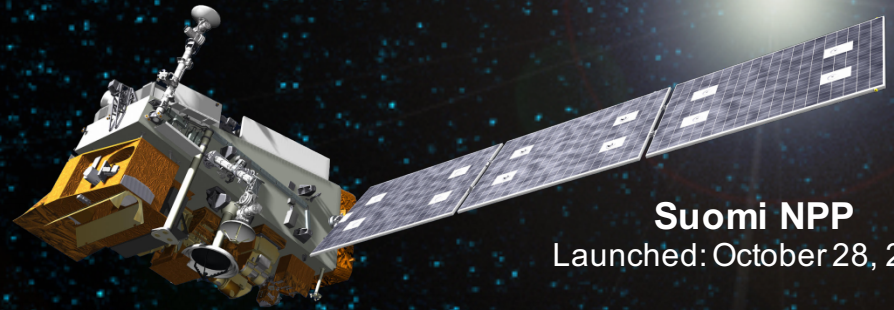
$11.3B over FY2010–FY2025

Polar Follow-on (PFO): JPSS-3, JPSS-4 and Mission Operations and Sustainment

$7.6B over FY2016–FY2038

Provides operational continuity of satellite-based observations and products

Supports all NOAA mission areas:
- Healthy Oceans
- Resilient Coastal Communities and Economies
- Climate Adaptation and Mitigation
- Weather Ready Nation

Suomi NPP
Launched: October 28, 2011

JPSS-1
Launch: 2017

JPSS-2
Launch: 2021

JPSS-3
Launch: 2026

JPSS-4
Launch: 2031

What are
POLAR SATELLITES?

Low Earth Orbit—512 miles

14x Orbits Earth 14 times pole-to-pole

2x Images entire globe twice a day

Unique instrumentation to measure moisture and temperature profiles throughout the atmosphere

Provide 85% of data used in numerical weather prediction

JPSS
PROVIDES...

the most critical data for numerical weather prediction to enable accurate 3–7 day forecasts.

operational weather and environment satellite observations for Alaska and Polar regions operational forecasting.

global coverage and unique day and night imaging capabilities in support of broad environmental monitoring and forecasting.

National and Global
COOPERATIVE EFFORTS

University Partner
Cooperative Institute
Prime Contractor

National and Global
COOPERATIVE EFFORTS (cont.)

Led by NOAA, implemented with NASA, and includes agreements with EUMETSAT, JAXA and DoD.
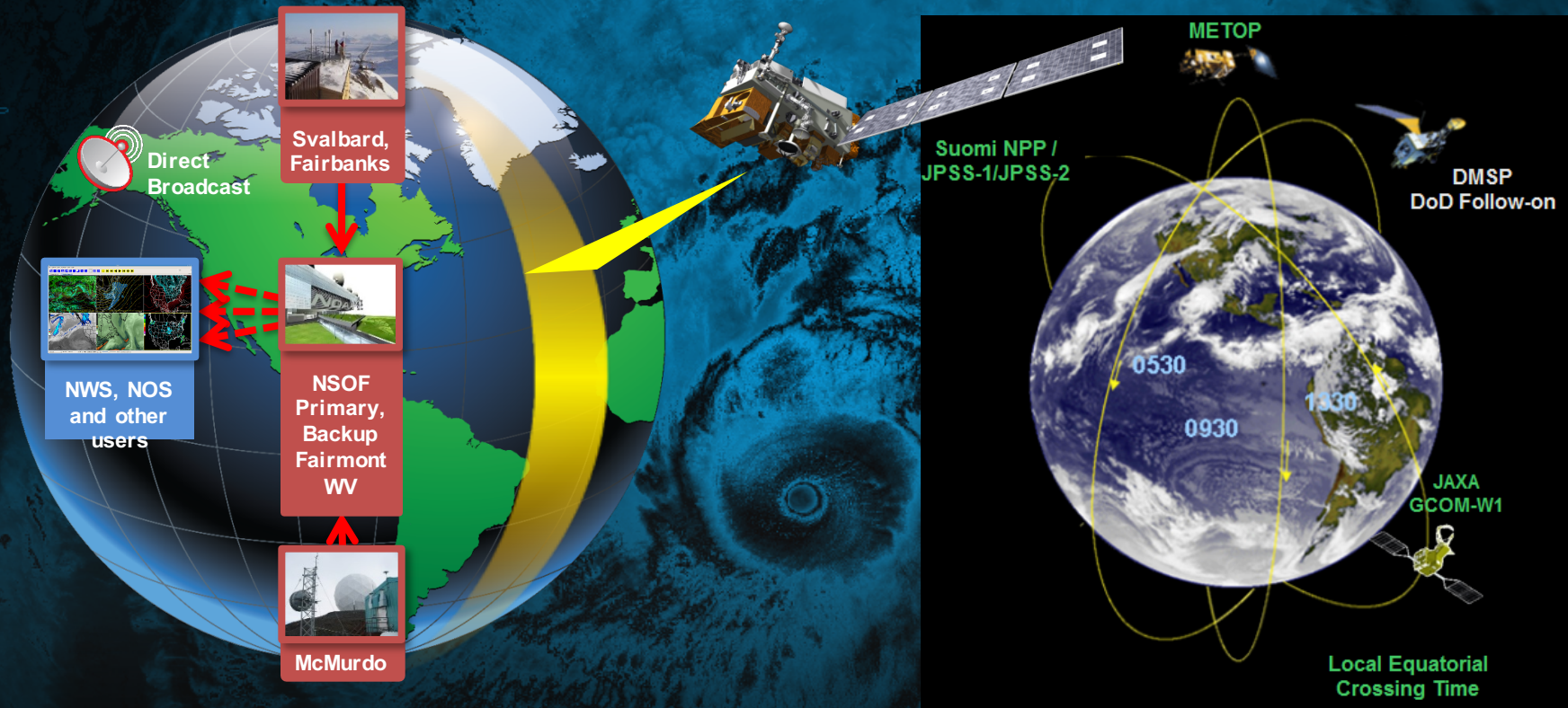
JPSS-1
SATELLITE

CERES
Clouds and the Earth's
Radiant Energy System

OMPS
Ozone Mapping
Profiler Suite

ATMS
Advanced Technology
Microwave Sounder

VIIRS
Visible Infrared Imaging
Radiometer Suite

CrIS
Cross-track
Infrared Sounder

JPSS-1
INSTRUMENTS

ATMS
Advanced Technology Microwave Sounder

CrIS
Cross-track Infrared Sounder

VIIRS
Visible Infrared Imaging Radiometer Suite

OMPS
Ozone Mapping and Profiler Suite

CERES
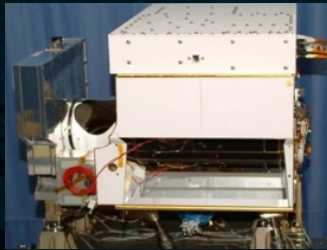Clouds and the Earth's Radiant Energy System

ATMS and CrIS together provide high vertical resolution temperature and water vapor information needed to maintain and improve forecast skill out to 5 to 7 days in advance for extreme weather events, including hurricanes and severe weather outbreaks.
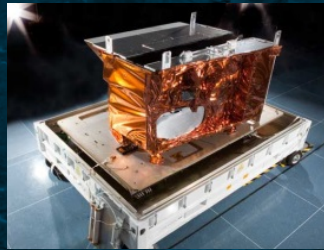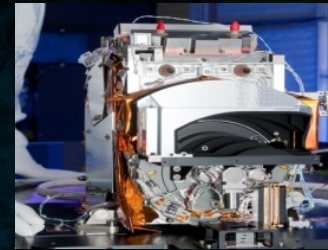
VIIRS provides many critical imagery products including snow/ice cover, clouds, fog, aerosols, fire, smoke plumes, vegetation health, phytoplankton and chlorophyll abundance.

Ozone spectrometers for monitoring ozone hole and recovery of stratospheric ozone and for UV index forecasts.

Scanning radiometer which supports studies of the Earth Radiation Budget (ERB).

NORTHROP GRUMMAN

HARRIS

Raytheon

Ball

NORTHROP GRUMMAN

Data
PRODUCTS

VIIRS (28 EDRs)

● AP, ● RDR, ● SDR

EDRs:

Active Fires
Aerosol Detection
Aerosol Optical Depth
Aerosol Particle Size
Albedo (Surface)
Annual Surface Type[5]
Cloud Height (Top and Base)
Cloud Cover/Layers
Cloud Mask
Cloud Optical Depth
Cloud Particle Size Distribution
Cloud Phase
Cloud Top Pressure
Cloud Top Temperature

Green Vegetation Fraction
Ice Age/Thickness
Ice Concentration
Ice Surface Temperature
●● Imagery
Land Surface Temperature
Ocean Color/Chlorophyll
Polar Winds
Sea Surface Temperature
Snow Cover
Surface Reflectance
Vegetation Health Index Suite
Vegetation Indices
Volcanic Ash Detection & Height

CrIS (5 EDRs)

● AP, ● RDR, ●● SDR

EDRs: Carbon Dioxide (CO_2)
Carbon Monoxide (CO)
Infrared Ozone Profile
Methane (CH_4)
Outgoing Long Wave Radiation

**CrIS/ATMS
(2 EDRs)**

EDRs: Atm Vertical Temperature Profile
Atm Vertical Moisture Profile

ATMS (11 EDRs)

● AP, ● RDR, ● SDR, ●● TDR

EDRs: Cloud Liquid Water   Rainfall Rate
Ice Concentration   Snow Cover
Imagery   Snow Water Equivalent
Land Surface Emissivity   Temperature Profile
Land Surface Temperature   Total Precipitable Water
Moisture Profile

**OMPS-Nadir
(2 EDRs)**

OMPS-N ● AP, ● RDR, ● SDR

EDRs: Ozone Total Column
Ozone Nadir Profile

OMPS-Limb[2]

OMPS-L ● AP, ● RDR

CERES/RBI[1]

● AP

KEY

AP – Application Packet
ASD – Application Process Identifier Sorted Data
RDR – Raw Data Record
SDR – Sensor Data Record
TDR – Temperature Data Record
EDR – Environmental Data Record
ESPC – Environmental Satellite Processing Center
● – Products with Key Performance Parameters
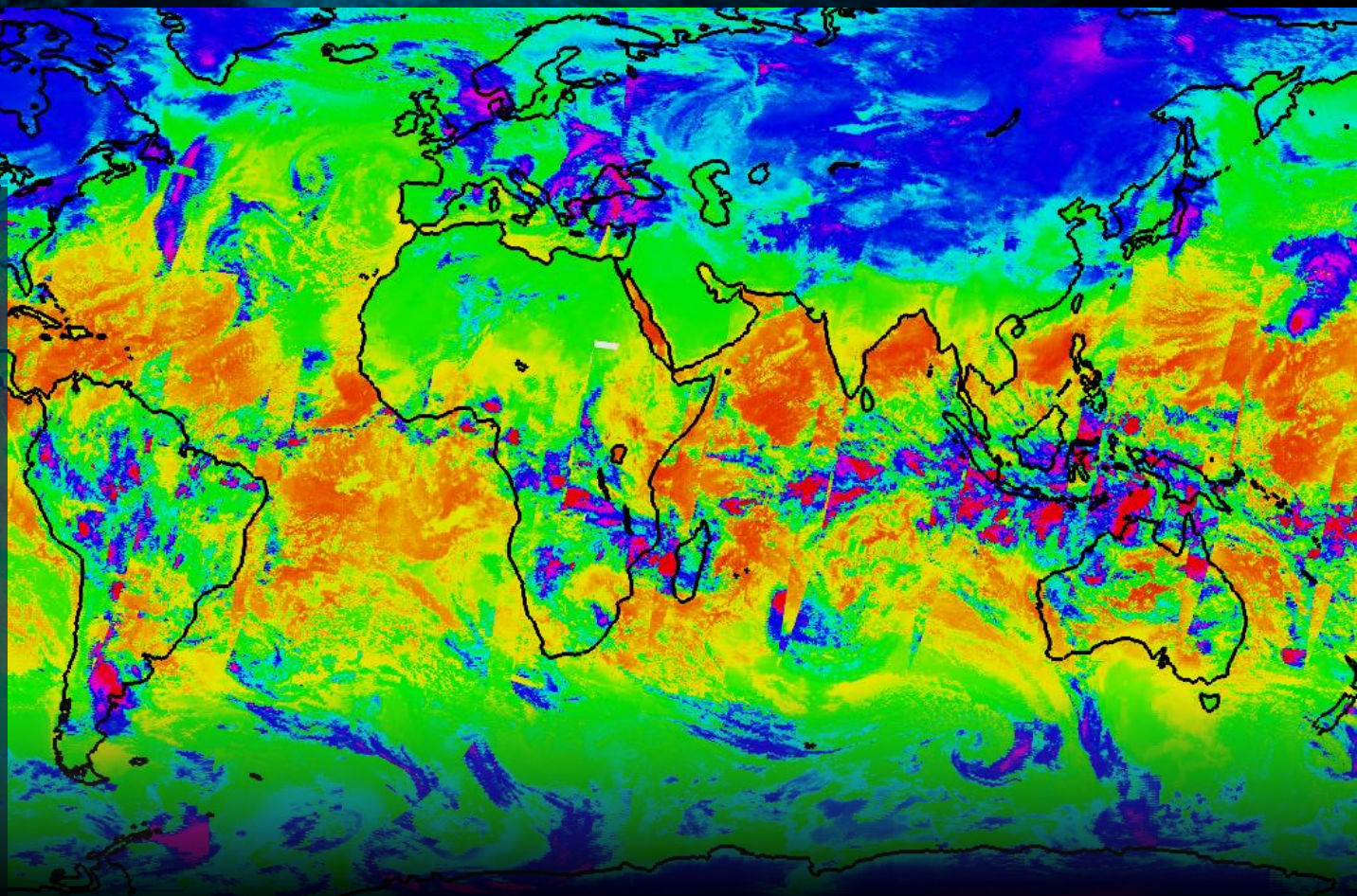● – Mission Unique Data Products

ADVANCED TECHNOLOGY MICROWAVE SOUNDER (ATMS) AND CROSS-TRACK INFRARED SOUNDER (CrIS)

- 3-D temperature and moisture profiles

- Rainfall rates and snow/ice information

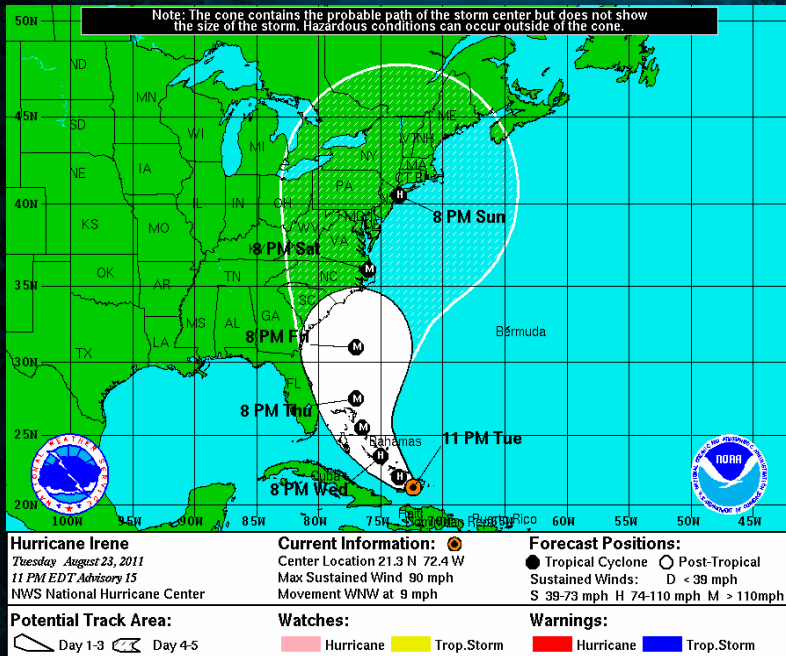- Improved short- and medium-term forecasting

- Improved storm tracking and climate prediction models
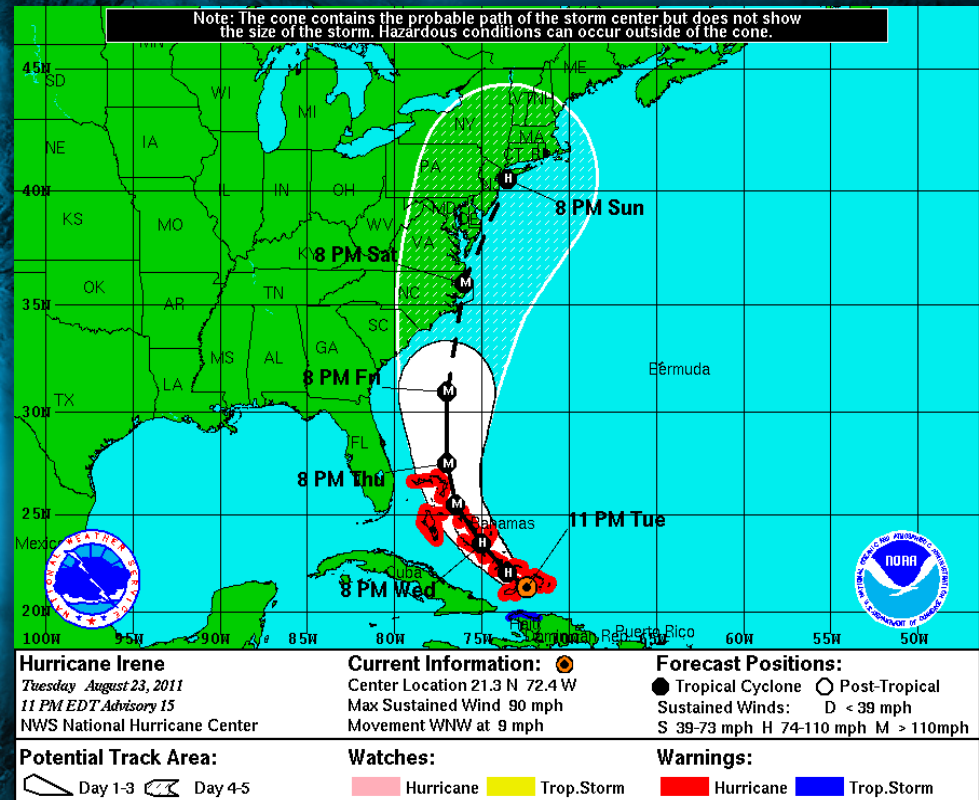
Supporting the
ADVANCED FORECAST ENTERPRISE

"2001" Irene Forecast

2011 Irene Forecast

▶ Without JPSS data, Hurricane Irene's path would have been less accurately predicted, resulting in more evacuations and greater economic impact to coastal communities.

VISIBLE INFRARED IMAGING RADIOMETER SUITE (VIIRS)

Algal Blooms

Nighttime Weather
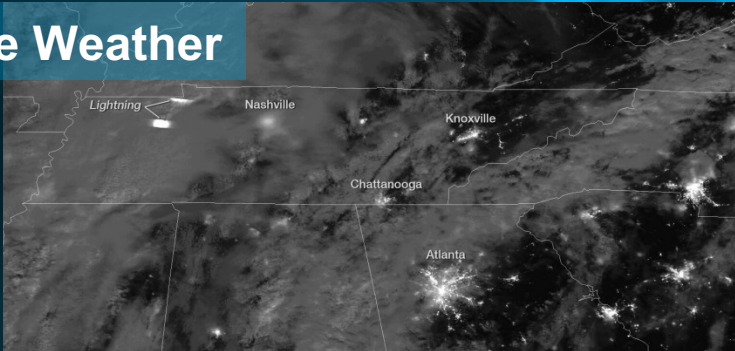
Active Fires

OZONE MAPPING AND PROFILER SUITE (OMPS)

ozone density profile
x10¹² ozone per cm³

density
elevation

6
0

40 km
10 km

6,000 km

satellite swath

South America

Antarctica
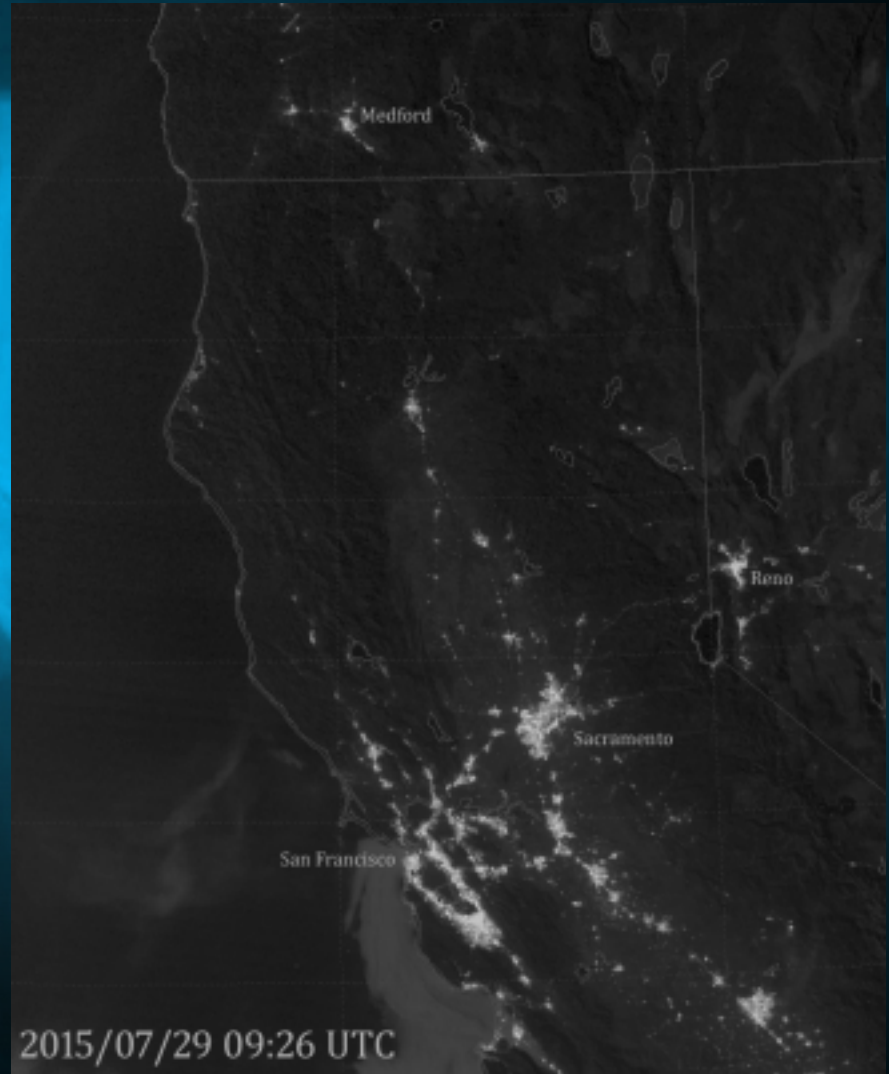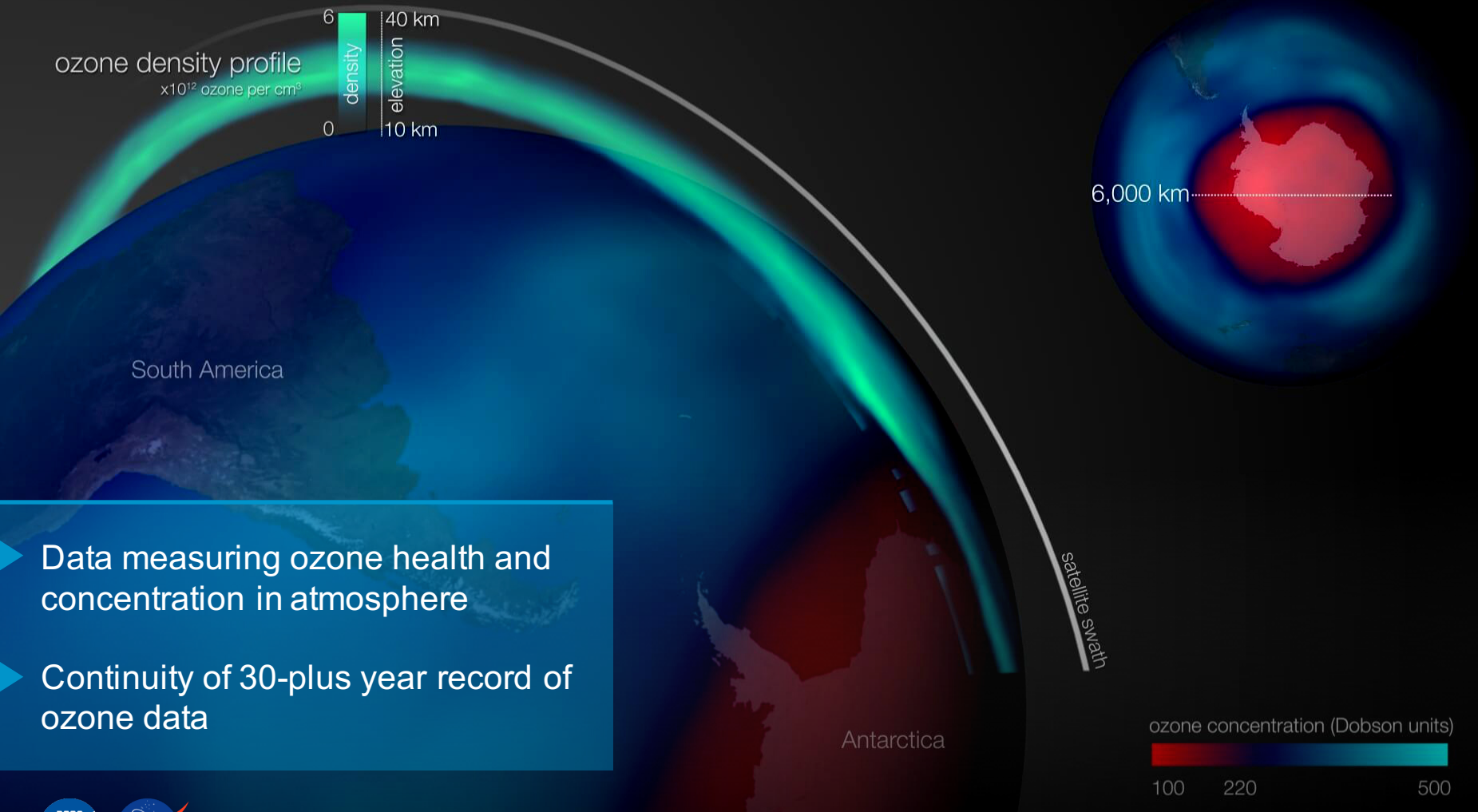
- Data measuring ozone health and concentration in atmosphere

- Continuity of 30-plus year record of ozone data

ozone concentration (Dobson units)

100   220   500

The future of
JPSS

JPSS will continue to provide high quality weather and environmental data and support the needs of the stakeholders and end users.

JPSS will continue the exploration of new scientific and societal applications for polar-orbiting data.

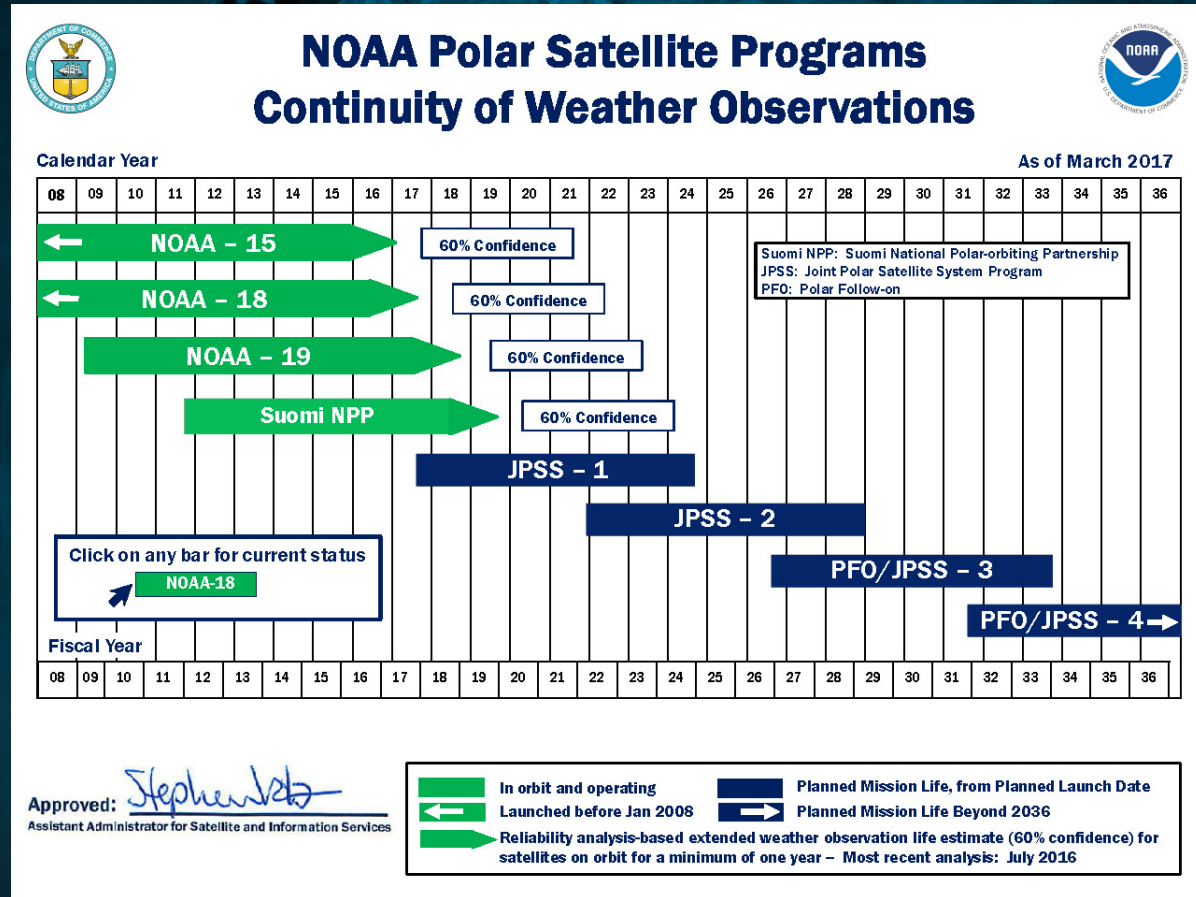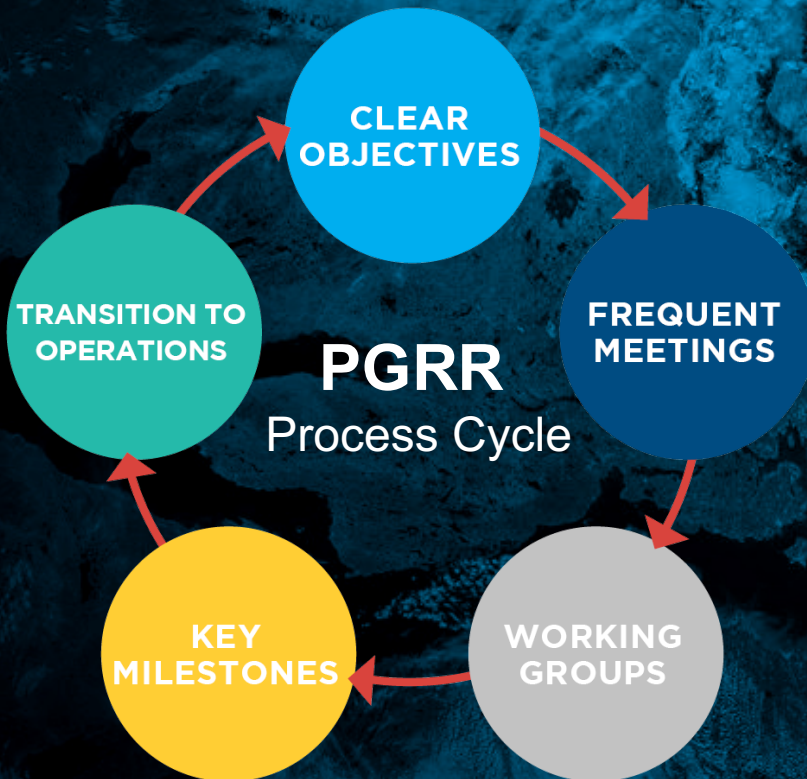## NOAA Polar Satellite Programs
Continuity of Weather Observations

Calendar Year   **As of March 2017**

| 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |

NOAA – 15   60% Confidence

NOAA – 18   60% Confidence

NOAA – 19   60% Confidence

Suomi NPP   60% Confidence

JPSS – 1

JPSS – 2

PFO/JPSS – 3

PFO/JPSS – 4

Suomi NPP: Suomi National Polar-orbiting Partnership
JPSS: Joint Polar Satellite System Program
PFO: Polar Follow-on

Click on any bar for current status
NOAA-18

Fiscal Year

| 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |

Approved: _____
Assistant Administrator for Satellite and Information Services

In orbit and operating   Planned Mission Life, from Planned Launch Date
Launched before Jan 2008   Planned Mission Life Beyond 2036
Reliability analysis-based extended weather observation life estimate (60% confidence) for satellites on orbit for a minimum of one year – Most recent analysis: July 2016

Proving Ground and Risk Reduction Program (PGRR)

The PGRR program develops and maintains engagement between JPSS experts and end users about data products and applications.

PGRR
Process Cycle

- CLEAR OBJECTIVES
- FREQUENT MEETINGS
- WORKING GROUPS
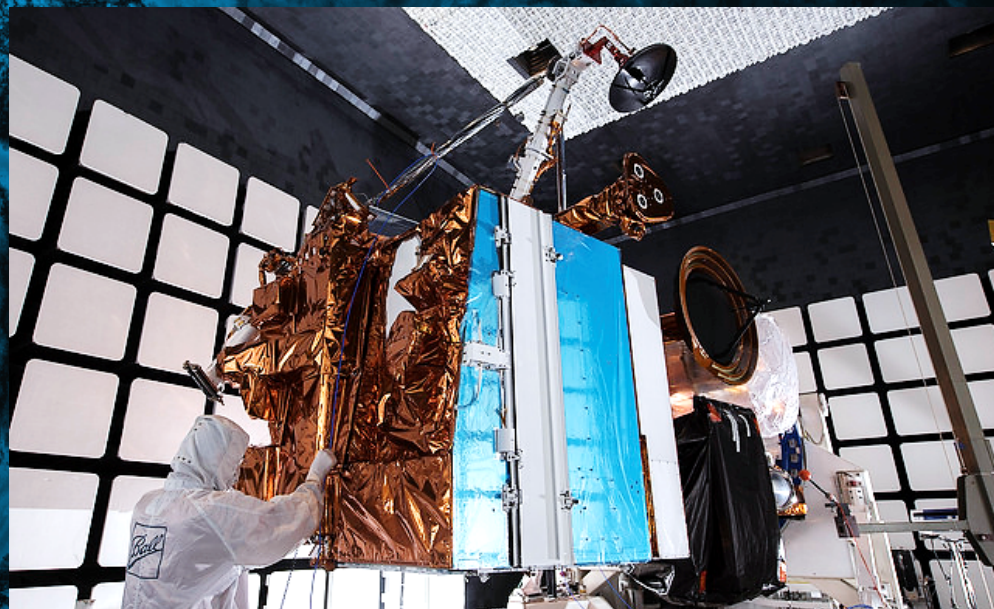- KEY MILESTONES
- TRANSITION TO OPERATIONS
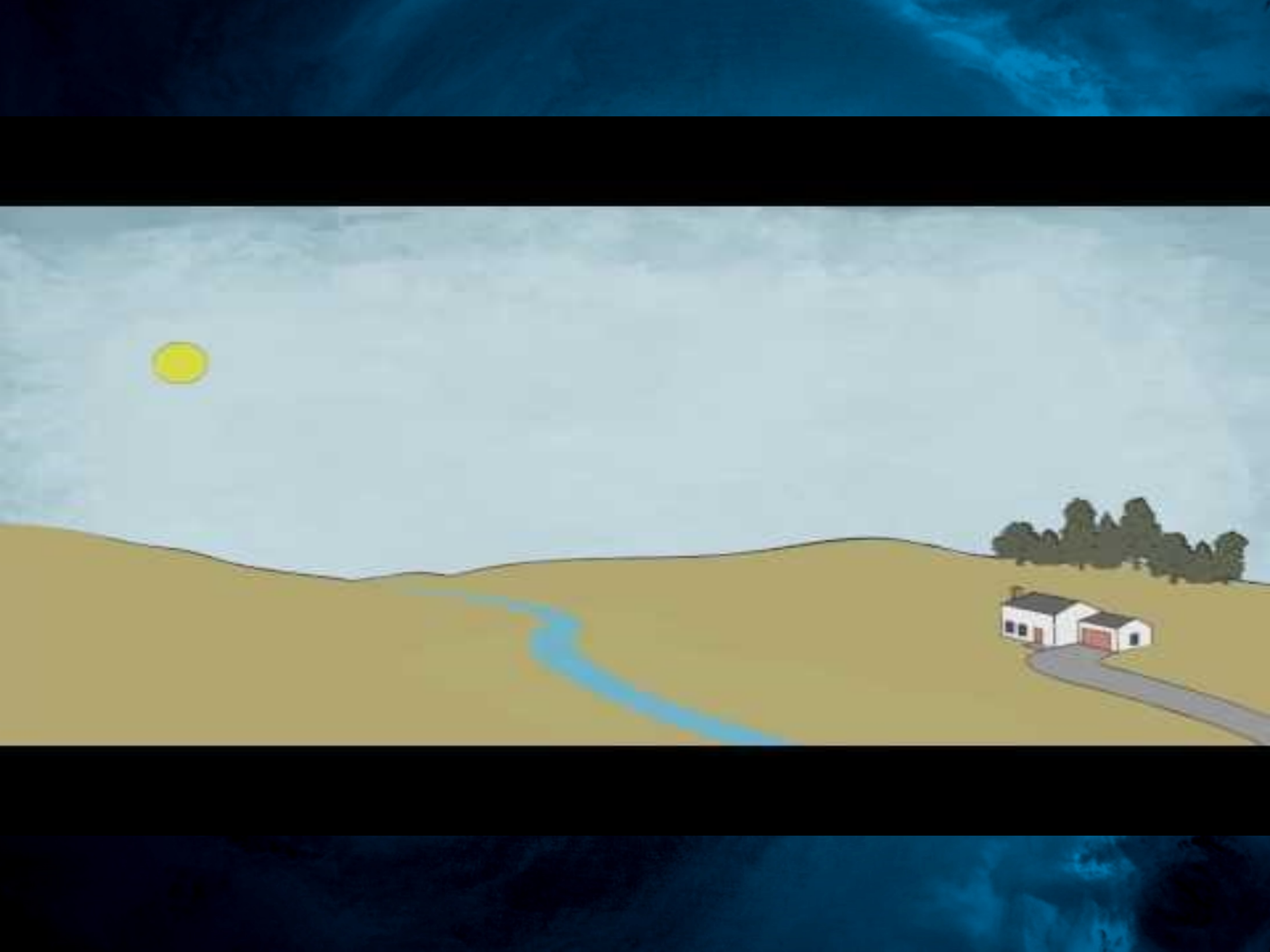
Project initiatives include:

- Hydrology
- Fire and Smoke
- Arctic
- Ocean and Coastal
- OCONUS and NCEP Service Centers–AWIPS
- River Ice and Flooding
- Sounding Applications
- Weather/Numerical Weather Prediction/Data Assimilation

THANK YOU!

For more information visit www.jpss.noaa.gov

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